UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,231	08/31/2006	Kei Tashiro	04853.0137	9331

22852 7590 03/22/2010

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER	
BUTTNER, DAVID J	
ART UNIT	PAPER NUMBER
1796	
MAIL DATE	DELIVERY MODE
03/22/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,231	TASHIRO ET AL.	
	Examiner	Art Unit	
	David Buttner	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/4/10*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim 1 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over SU422262.

The reference exemplifies (#2) reacting carbon dioxide with an epoxidized polyisoprene. The carbon dioxide and epoxy group produce cyclocarbonate groups (page 2 line 4 of reference). As recognized by applicant (page 6 line 28), natural rubber is primarily polyisoprene. The reference performs the same reaction as applicant and therefore would exhibit the same final structure.

Claims 1-8 rejected under 35 U.S.C. 103(a) as being unpatentable over SU422262 in view of JP2002053573 in further view of Tanaka 6204358.

SU422262 does not state the carbon dioxide is provided in a supercritical state or state the source of its polyisoprene.

JP2002053573 (abstract) teaches epoxy groups can be reacted with supercritical carbon dioxide to form cyclocarbonate without the need of a catalyst. It would have been obvious to carry out SU422262's CO_2/epoxy reaction under supercritical conditions in order to avoid using a catalyst. The expense of the catalyst and separation problems associated with the catalyst are therefore avoided (paragraph 2 of JP2002053573). The reaction conditions of JP200205373 include pressures of 60-90kg/cm^2 (paragraph 15); temperatures of 70-180^{0}C (paragraph 14); times of 30 min-24 hours (paragraph 16) and dimethylformamide solvent (paragraph 12).

Natural rubber (a polyisoprene) is known to be superior to synthetic rubber in mechanical properties (col 1 line 28-36 of Tanaka). Additionally, removal of non-rubber components from such natural rubber (ie "deproteinizing") is known to improve mechanical properties and result

in more uniform batch to batch properties (col 2 line 44-58) and reduce allergic skin reactions (col 2 line 28-37).

It would have been obvious to utilize a "deproteinized" natural rubber as the source of SU422262's polyisoprene for the expected advantages.

Note that applicant's claim 5 does not require an ionic liquid be present, but merely limits the species of ionic liquid in the markush group of claim 3.

Claims 1-8 rejected under 35 U.S.C. 103(a) as being unpatentable over SU422262 in view of the Kawanami article in Society of Chemical Engineers Japan in further view of Tanaka 6204358.

SU422262 does not state the carbon dioxide is provided in a supercritical state or state the source of its polyisoprene.

Kawanami teaches epoxy groups can be reacted with supercritical carbon dioxide in the presence of ethylmethylimidazole tetrafluoroborate to form cyclocarbonate in times (eg 2 hours) much shorter than SU422262 (eg 14-20 hours). It would have been obvious to conduct the SU422262 reaction of epoxidzed polyisoprene with CO_2 under supercritical conditions to hasten reaction time.

Kawanami's reaction conditions include a pressure of 6MPa and temperature of 80^0C.

Natural rubber (a polyisoprene) is known to be superior to synthetic rubber in mechanical properties (col 1 line 28-36 of Tanaka). Additionally, removal of non-rubber components from such natural rubber (ie "deproteinizing") is known to improve mechanical properties and result in more uniform batch to batch properties (col 2 line 44-58) and reduce allergic skin reactions (col 2 line 28-37).

It would have been obvious to utilize a "deproteinized" natural rubber as the source of SU422262's polyisoprene for the expected advantages.

Note that applicant's claim 4 does not require these amide solvents be present, but merely limits the species of nonionic solvents in the larger markush group of claim 3.

Shalub 5962147 is cited of interest for its showing of "deproteinized" natural rubber in adhesives.

Applicant's arguments filed 2/4/10 have been fully considered but they are not persuasive.

Applicant argues that claim 1's "consisting essentially of" excludes 3,4 units that must inherently be present in the SU422262's polyisoprene.

This is not convincing. The "consisting essentially of" doesn't limit the pictured structure of claim 1, but instead limits what additives can be added to the polymer.

Secondly, even if properly amended to describe the polymer's units as "consisting essentially of" the pictured units, applicant fails to provide any showing that a small amount of 3,4 units would materially change the characteristics applicant's invention (MPEP 2111.03). Clearly, applicant intends that some extra units are permissible or "consisting of" would have been used.

Thirdly, the record is not convincing that applicant's natural rubber lacks 3,4 units. The Komuro article cited by applicant and the Dictionary of Rubber show that natural rubber does have 3,4 units.

Arguments relating to the "deproteinizing" step are met by the newly cited Tanaka reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Buttner whose telephone number is 571-272-1084. The examiner can normally be reached on weekdays from 10 to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jim Seidleck, can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Buttner

3/17/10

/David Buttner/

Primary Examiner, Art Unit 1796